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CLAIMS

[Claim(s)]

[Claim 1]A damper possessing a row of teeth characterized by comprising the following.

The first solid of revolution possessing an attachment part for attaching enabling free rotation.

The second solid of revolution that formed a crevice which accommodates a viscous body and was provided relatively to the first solid of revolution between this first solid of revolution enabling free rotation.

It can attach to the first solid of revolution, enabling free rotation, and is the first gear of *****.

In [provide the second gear that meshed with this first gear and adhered to the second solid of revolution, and] mutual relative rotation with the first solid of revolution and the second solid of revolution, It is a lacking part so that viscous resistance may be generated and made to a viscous body accommodated in a crevice and the first and the second gear may sever transfer to the second solid of revolution of rotation of the first solid of revolution in a predetermined revolutions region.

[Claim 2]The damper according to claim 1 it was made to make generate viscous shear strength in a viscous body accommodated in a crevice in mutual relative rotation with the first solid of revolution and the second solid of revolution.

[Claim 3]The damper according to claim 1 or 2 in which the center of an imaginary circle which is carrying out eccentricity of the center of an imaginary circle which a row of teeth of the first gear draws from a center of rotation of the first solid of revolution, and a row of teeth of the second gear draws is carrying out eccentricity in an eccentric direction and the direction of an imaginary circle which a row of teeth of the first gear draws from a center of rotation of the second solid of revolution.

[Claim 4]The damper according to claim 1 or 2 with which the center of an imaginary circle which a row of teeth of the first gear draws is allotted to a center of rotation of the first solid of revolution, and the center of an imaginary circle which a row of teeth of the second gear draws is allotted to a center of rotation of the second solid of revolution.

[Claim 5]A step parking brake which uses the damper according to any one of claims 1 to 4 for a pedal arm.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the damper which fitted the rotation giving a predetermined resistance force to the member which reclining seats, such as a pedal arm of a damper, for example, a step parking brake, a large-sized pivoted window, and a car, etc. rotate.

[0002]

[Description of the Prior Art]As this kind of a damper, it is provided to housing and this housing, enabling free rotation, and the conventional proposal of the thing possessing the solid of revolution which makes the viscous body enclosed in housing by the relative rotation to housing produce viscous shear strength of a type is made for example.

[0003]

[Problem(s) to be Solved by the Invention]By the way, in this conventional type of damper, when relative rotating speed is [it is mutual / between the housing and solid of revolution under operation] the same, Since the resistance force to generate becomes the same in any rotary place of the solid of revolution to housing, For example, in the case where it uses as a thing to which the return to the initial position of the pedal arm of a step parking brake is made to perform smoothly, If the resistance force immediately after the treading-in release to a pedal arm is designed as sufficient thing, the resistance force in the neighborhood where the rotation return of the pedal arm is carried out in an initial position becoming large more than needed, therefore the recovery time to the initial position of a pedal arm becoming late, on the other hand, If a pedal arm makes low the resistance force in the neighborhood which returns to an initial position, designs it and makes a desired thing recovery time to the initial position of a pedal arm, The resistance force immediately after the treading-in release to a pedal arm will not become sufficient, but it rotates with sufficient vigor to an initial position, a pedal arm crashes into a

stopper, and there is fear, such as breakage of a tap tone and the pedal arm by a shock, and a stopper.

[0004]The place which this invention is made in view of said many points, and is made into the purpose, For example, it is in providing the damper which fitted the rotation giving a predetermined resistance force to the member which reclining seats, such as a pedal arm of a step parking brake, a large-sized pivoted window, and a car, etc. rotate.

[0005]There is a place made into the purpose of this invention in being able to make it the thing of a request of return rotating speed and the return time required to the member to rotate, being able to avoid the crash to the stopper in an initial position, etc., and providing the damper which can abolish fear, such as basing-on tap tone and shock breakage.

[0006]

[Means for Solving the Problem]The first solid of revolution that possesses an attachment part for attaching said purpose, enabling free rotation according to this invention, The second solid of revolution that formed a crevice which accommodates a viscous body and was provided relatively to the first solid of revolution between this first solid of revolution enabling free rotation, In [can attach to the first solid of revolution, enabling free rotation, provide the first gear of *****, and the second gear that meshed with this first gear and adhered to the second solid of revolution, and] mutual relative rotation with the first solid of revolution and the second solid of revolution, Viscous resistance is generated and made to a viscous body accommodated in a crevice, and the first and the second gear are attained by damper possessing a row of teeth with a lacking part so that transfer to the second solid of revolution of rotation of the first solid of revolution may be severed in a predetermined revolutions region.

[0007]According to this invention, said purpose is attained by step parking brake which uses the above-mentioned damper for a pedal arm.

[0008]In a desirable example of this invention, the center of an imaginary circle which a row of teeth of the first gear draws is allotted to a center of rotation of the first solid of revolution, In rotation of the first solid of revolution [the center of an imaginary circle which a row of teeth of the second gear draws may be allotted to a center of rotation of the second solid of revolution, and] centering on an attachment part, The center of an imaginary circle which a row of teeth of the first gear draws may carry out eccentricity from a center of rotation of the first solid of revolution, and the center of an imaginary circle which a row of teeth of the second gear draws may be carrying out eccentricity in the first eccentric direction and the direction of a row of teeth of a gear from a center of rotation of the second solid of revolution so that a running torque radius to the second solid of revolution may be changed.

[0009] Although a viscous body accommodated in a crevice is made to generate viscous resistance in mutual relative rotation with the first solid of revolution and the second solid of revolution and this obtains damper mechanism in this invention, viscous shear strength is generated and it may be made to mainly obtain damper mechanism by this in a desirable example. As a viscous body, although a viscous body with a coefficient of viscosity of about 1000-400000 P, for example, a silicone oil etc., is preferred, it may not be limited to this but other viscous bodies, for example, viscous fluid, may be sufficient.

[0010]

[Function] In the damper of this invention, if the first solid of revolution attaches and a part is rotated as a center, the second solid of revolution will rotate relatively to the first solid of revolution by mutual engagement of the first and the second gear. In the relative rotation of this first solid of revolution and second solid of revolution, viscous resistance occurs in the viscous body accommodated in the crevice, This serves as viscous resistance force over the relative rotation of the first solid of revolution and the second solid of revolution, and performs the damper action to the pedal arm of the member turning around the first solid of revolution, for example, a step parking brake. And since the row of teeth of the first and the second gear has a lacking part and the transfer to the second solid of revolution of rotation of the first solid of revolution is severed in a predetermined revolutions region, desired rotational resistance can be obtained in the arbitrary rotary places of the first solid of revolution centering on an attachment part.

[0011]

[Specific Example(s)] The first solid of revolution 4 that possesses the attachment part 3 for attaching the damper 1 of this example, enabling free rotation in drawing 3 from drawing 1, The second solid of revolution 7 that formed the crevice 6 which accommodates the viscous body 5, and was provided relatively to the solid of revolution 4 between the solids of revolution 4 enabling free rotation, In [can attach to the solid of revolution 4 in the attachment part 3 and homotopic enabling free rotation, provide the first gear 52 of *****, and the second gear 54 that meshed with the gear 52 and adhered to the solid of revolution 7, and] mutual relative rotation with the solid of revolution 4 and the solid of revolution 7, He is trying to make the viscous body 5 accommodated in the crevice 6 generate viscous shear strength in viscous resistance and this example.

[0012] the solid of revolution 4 -- half [one] -- the housing body 11 which is a percent person object, and half [of another side] -- the lid 12 which is a percent person object, [provide and] It consisted of the housing 14 which formed in the inside the chamber houses 13 in which the viscous body 5 is accommodated, and the housing body 11 and the lid 12 have adhered so that it may double exactly by the mating faces 15 and 16 and may not separate mutually by the rivet 17. The seal

ring 18 is fitted in the annular hollow 19 formed in the mating face 16 of the lid 12 so that the viscous body 5 may not begin to leak from the mating faces 15 and 16 of the housing body 11 and the lid 12. The housing body 11 possesses the attachment hole 25 which carried out the opening in the field 24 of another side of the outline elliptic plate-like base 21, the cylindrical shank 23 which projected in one and was formed from one field 22 of the base 21, and the base 21, and was continued and extended to the base 21 and the shank 23, and was formed in the shank 23 and the same mind.

The breakthrough 26 is formed in the part equivalent to the attachment part 3. The lid 12 is projected in one from the outline elliptic plate-like base 31 and one field 32 of the base 31, and possesses the shank 23, the body 33 formed in the same mind, and the inner direction annular flange 34 formed in the inner direction in one from the body 33.

The breakthrough 35 the breakthrough 26, concentric, and isomorphous is formed in the part equivalent to the attachment part 3.

[0013]The solid of revolution 7 possesses annular Itabe 41 allotted to the chamber houses 13 and the cylindrical part 42 which projected in one from annular Itabe 41, was formed in the shank 23 and the same mind, and was attached in the shank 23 enabling free rotation.

In the cylindrical part 42, two or more projected rims 44 are formed in the peripheral face of the cylindrical part 43 of a byway in one at the circumferential direction. The seal ring 45 is formed so that the viscous body 5 may not begin to leak between the body 33 and the cylindrical part 42.

[0014]The body 51 is inserted in the breakthroughs 26 and 35, enabling free rotation it can attach to the solid of revolution 4 by this, enabling free rotation, and the sector gear 52 is *****. The color 61 made from aluminum is attached in the body 51 by being carried out so that it may not rotate relatively mutually by mutual engagement of the gear teeth 62 and 63 formed in the inner skin of the body 51 and the peripheral face of the color 61, respectively. The projected rim 44 fitted into two or more grooves 71 formed in the breakthrough 53, and the sector gear 54 has adhered so that it may not rotate relatively to mutual to the solid of revolution 7. The center 76 of the imaginary circle 100 of the radius r_1 which the row of teeth 75 of the gear 52 draws is carrying out eccentricity only of the distance L_1 toward the center of rotation 80 of the solid of revolution 7 from the center of rotation 77 of the solid of revolution 4.

The center 79 of the imaginary circle 101 of the radius r_2 which the row of teeth 78 of the gear 54 draws is also carrying out eccentricity only of the distance L_1 in the eccentric direction and the direction of the imaginary circle 100 which the row of teeth 75 of the gear 52 draws from the center of rotation 80 of the solid of

revolution 7.

In this example, although the radius Y of the imaginary circle 100 and the radius X of the imaginary circle 101 are mutually equal, they may change these mutually. The gears 52 and 54 possess the rows of teeth 75 and 78 with the lacking parts 85 and 86, respectively so that the transfer to the solid of revolution 7 of rotation of the solid of revolution 4 may be severed in a predetermined revolutions region. In the case where the damper 1 is applied to the pedal arm of a step parking brake in this example so that it may mention later, . As shown in drawing 6 (a), the return power of a pedal arm becomes weak. If it puts in another way, the lacking part 85 and the lacking part 86 will meet near the initial position P1 of the pedal arm which is a field where the return speed of a pedal arm becomes slow, and this position P1, and engagement with the gear 52 and the gear 54 will be canceled. In this example, the upper surface of the lacking part 85 serves as a convex outside, the upper surface of the lacking part 86 serves as a convex inside, and dissolution of engagement is made by sliding between the upper surfaces of the lacking parts 85 and 86.

[0015]The damper 1 formed as mentioned above is applied to the step parking brake 91, as shown, for example in drawing 4. Here, it is fixed and the damper 1 is used so that the gear 52 may not rotate into the body 93 of a car with the bolt 92 inserted in the breakthrough 81 of the color 61. And the pedal arm 94 of the step parking brake 91, In the homotopic fixed to the body 93 of a car, on the other hand, it is attached to the body 93 by the gear 52, enabling free rotation, and on the other hand, The really formed shank 95 is attached in the attachment hole 25, and it is used for the pedal arm 94 so that it may connect with the solid of revolution 4 in the center of rotation of the solid of revolution 7 to the solid of revolution 4. In this invention, the pedal arm 94 does not need to be connected with the solid of revolution 4 in the center of rotation of the solid of revolution 7 to the solid of revolution 4, and may be other parts. The pedal arm 94 is energized by the pedal initial rotating position (position shown in drawing 4) by the elastic means 96 so that a rotation return may be carried out.

[0016]In the step parking brake 91 with damper 1 constituted as mentioned above. By getting into the pedal 97, it rotates in the direction of R centering on the part of the bolt 92, and the housing 14 which is the solid of revolution 4 also rotates the pedal arm 94 in the direction of R centering on the part of the bolt 92 with this. The gear 54 which has the row of teeth 78 which gears to the row of teeth 75 of the gear 52 by rotation of the housing 14 rotates in the direction of C. If the gear 54 rotates in the direction of C, the solid of revolution 7 which adhered to the gear 54, As a result of rotating relatively to the direction of C to the housing 14, annular Itabe 41 also rotates relatively [it is the same and] to the direction of C to the housing 14, Viscous shear strength arising in the viscous body 5 of the chamber houses 13 by this, and the resistance force (torque) T to rotation of the pedal arm

94 being given by this viscous shear strength, the pedal arm 94 is brought to the maximum treading-in position P1 as shown in drawing 5, and the maximum brakes are applied. When treading in to the pedal 97 is canceled in the maximum treading-in position P1 as shown in drawing 5, by the elastic means 96 the pedal arm 94, Rotate to the above and reverse and viscous shear strength arises in the viscous body 5 like the above during this rotation, The resistance force T to rotation of the pedal arm 94 being given by this viscous shear strength, the pedal arm 94 returns to the initial position P2 as shown in drawing 4, and that rotation is stopped in contact with a stopper (not shown).

[0017]By the way, since the confrontation of the lacking parts 85 and 86 is made to occur near the initial rotating position P1 of the pedal arm 94, and this position and the gear 52 and the gear 54 are kept from meshing mutually, As a result of annular Itabe's 41 not rotating near the initial rotating position P1 and this position, the resistance force T to rotation of the pedal arm 94 by viscous shear strength is not given. The center 76 of the row of teeth 75 of the gear 52 carries out eccentricity only of the distance L1 from the center of rotation 77 of the solid of revolution 4, Since only the distance L1 is carrying out eccentricity also of the center 79 of the row of teeth 78 of the gear 54 in the eccentric direction and the direction of the row of teeth 75 of the gear 52 from the center of rotation 80 of the solid of revolution 7, In rotation of the solid of revolution 4 of a direction contrary to the direction of R, the running torque radius X (distance of the meshed part of the gears 52 and 54 and the center of rotation 80 of the solid of revolution 7) of the solid of revolution 7 will change so that it may become large. On the other hand, in rotation of the solid of revolution 4 of a direction contrary to the direction of R, the distance Y of the meshed part of the gears 52 and 54 and the center of rotation 77 of the solid of revolution 4 will change so that it may become short. Therefore, by rotation of the constant speed of the solid of revolution 4 from the pedal maximum treading-in position P1 to the pedal initial rotating position P2, the revolving speed of the solid of revolution 7 becomes slow gradually. The rotational resistance T of the solid of revolution 4 to which this originates in the viscous shear strength of the viscous body 5. If the solid of revolution 4 rotates with constant speed by centering on the part of the bolt 92, When it means becoming small and this is considered in connection with the spring power of the elastic means 96 for a return as the pedal initial rotating position P1 is approached, the rotational resistance T of the size corresponding to the size of the spring power of the elastic means 96 will be obtained to the solid of revolution 4.

[0018]The resistance force T to rotations of the pedal arm 94 of the direction which goes to the pedal initial rotating position P1 by the spring power of the elastic means 96. If viscous shear strength power produced by the viscous body 5 is set to F and the resistance force (torque) T1 to rotations of the solid of revolution 7 by

this viscous shear strength power F is made into $T1=F-X$, It is given by $T=F-Y$, therefore in the damper 1. When the pedal arm 94 rotates from the pedal maximum treading-in position P2 to the pedal initial rotating position P1 by the elastic means 96, Since the running torque radius X becomes large gradually and the distance Y becomes small gradually as the pedal arm 94 approaches the pedal initial rotating position P1, as the resistance force T to the pedal arms 94 shows drawing 6 (a), it becomes small gradually. As a result of canceling engagement with the gear 52 and the gear 54 and annular Itabe's 41 not rotating near the initial rotating position P1 and this position, the resistance force T to rotation of the pedal arm 94 by viscous shear strength is not given. As the damper 1 shows to drawing 6 (a) by the above, in the beginning of the return operation from the maximum treading-in position P2 of the pedal arm 94 to the initial position P1, the pedal arm 94 is rotated comparatively slowly by the big resistance force T . On the other hand, since it is the small resistance force T even if the elastic force of the elastic means 96 becomes weak when the pedal arm 94 rotates to about initial position P1, the pedal arm 94 is rotated comparatively quickly. In addition, since the gear 52 and the gear 54 do not mesh mutually near the initial rotating position P1 and this position, even if the resistance force T is not given but the elastic force of the elastic means 96 becomes weak like the above, it rotates smoothly quickly and the pedal arm 94 returns to an initial rotating position. Thus, in the step parking brake 91 possessing the damper 1. Even if it designs the damper 1 so that the crash to the stopper of the pedal arm 94, etc. is avoided, things may be made and rotation of the pedal arm 94 near the initial position may be quickly made by request, Since the pedal arm 94 is rotated comparatively slowly in the direction contrary to the direction of R from the beginning of the return rotation to an initial position to the middle, the crash to the stopper of the pedal arm 94 by the first high-speed rotation can be eliminated certainly.

[0019]By the way, although eccentricity of the centers 76 and 79 of the rows of teeth 75 and 78 was carried out in the above, respectively, Without replacing with this and carrying out eccentricity of the centers 76 and 79 of the rows of teeth 75 and 78, respectively, It is good also as a damper in which the characteristic as allotted to the centers of rotation 77 and 80 of the solids of revolution 4 and 7 and shown in (b) of drawing 6 is shown, and further above, Constituted the gears 52 and 54 so that the lacking parts 85 and 86 might meet only near the initial rotating position P1 of the pedal arm 94, and this position P1, but. It is good also as a damper in which the characteristic as replaced with this, had a lacking part in two or more fields, constituted the gears 52 and 54 and shown in drawing 6 (c) or (d) is shown. Namely, what is necessary is just to constitute the damper in which the characteristic corresponding to the object to be used is shown.

[0020]

[Effect of the Invention] Since the first and the second gear possess the row of teeth with a lacking part according to this invention as mentioned above so that the transfer to the second solid of revolution of rotation of the first solid of revolution may be severed in a predetermined revolutions region, For example, a predetermined resistance force can be given to the rotation to the member which reclining seats, such as a pedal arm of a step parking brake, a large-sized pivoted window, and a car etc. rotate, Return rotating speed and the return time required can be made into a desired thing to the member to rotate, and also the crash to the stopper in an initial position, etc. can be avoided, and fear, such as basing-on tap tone and shock breakage, can be abolished.

[Translation done.]